

## ARRAY TECHNOLOGY AND APPLICATIONS

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### ROLE OF PV IN ADVANCED MISSIONS

- o What limits use of PV
  - Cost, panel efficiency, system efficiency, control problems, weight, environmental factors
- o Limits are mission dependent
- o What are mission system goals
- o What system goals are required to compete with other power systems
- o What goals should be used to drive array technology
- o Recommend setting goals and timetable for evolving missions
- o Determine both enabling and growth objectives
- o Concentrators can have an important role

### MISSION GOAL ANALYSIS

- o Defined as critical need
- o Allows analysis of commonality
- o Defines multi-mission benefits of PV funding

#### Example

<u>*Missions</u>	<u>Pwr. kw</u>	<u>w/kg</u>	<u>w/m<sup>2</sup></u>	<u>Life years</u>
1	200		300	5-10
2	5-25	50		10
3	10-50	20	200	5
4	5-10	150		5

- \*1. LEO, high power
- 2. GEO, medium power, lightweight
- 3. Intermediate, radiation resistant
- 4. Interplanetary, ultralightweight

### TESTING OF ADVANCED CONCEPTS

- o Flight and ground demonstration critical to getting project support
- o Expensive facilities required for testing concentrator and ultralight flexible arrays
- o What risks related to minimum testing are acceptable to projects
- o Need to coordinate and expedite flight experiments
- o Testing needed to provide feedback to device development

### COST CONSIDERATIONS

- o Relationship between array and system cost is not straight line
- o Effect of array on system level costs are mission dependent and include:
  - Array development, fabrication and test
  - System testing
  - Array life
  - Related PV system costs
  - Costs related to requirements on other spacecraft systems
- o PV community needs to become more aware and active in system level design and planning

### VIABILITY OF U.S. ARRAY INDUSTRY

- o Minimum funding of panel technology
- o European structures superior for many near term missions
- o Heavy European government support
- o U.S. companies making serious make/buy decisions for European arrays
- o More U.S. structural programs required for both near and far term missions